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09/960,419	09/21/2001	Shoji Ikeda	0941.65839	5534

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EXAMINER

FALASCO, LOUIS V

ART UNIT

PAPER NUMBER

1773

DATE MAILED: 07/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/960,419

Applicant(s)

IKEDA ET AL.

Examiner

Louis Falasco

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

Claims

The claims are 1 to 20 all claims remain under consideration.

Papers Received

Applicants' Amendment A has been received as paper #4.

Objections

The examiner has withdrawn objections made in the previous Office action.

Rejections

Statutory basis

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Rejections

1. Claims 1 through 20 are rejected as being unpatentable under 35 U.S.C. 103 over the teachings of **Sasaki** (US 6210544).

Sasaki et al encompasses the required claimed Fe-Co-M-O composition of the thin film layer and the claimed Fe-Co-M-O composition recording head.

In **Sasaki et al** the composition preferably is:

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(Co 1- (between 0 and .7) Fe (i.e. "Q" is Fe) (between 0 and .7)) (balance) M(= to Al, Zr,

Ti, Hf, Mo, Si, W, B, Al, Ge, Ga or any Rare Earth) (between 3 and 30) O (between

7 and 40) X (at zero to 19)

- Noted for instance at col. 3 lns 32 - 48, with ratios col. 7 26-51, col. 8 lns 44-54 also note the **Sasaki** film composition may have the element 'X' is at zero.

It would have been obvious to one having ordinary skill in the art at the time of the invention to adopt the **Sasaki** film composition motivated to induce soft magnetism in the layer (claims 1-18) or magnetic Head (claims 19 and 20).

This soft magnetism would have been desirable in view of the **Sasaki** teaching the magnetic character may be improved by adjusting the presence of 'X' and the quantity of 'X' is a matter of choice to reduce the corrosion - the presence of 'X' is merely a matter of choice offsetting desired characteristics as flux densities, specific resistances and saturation magnetism (col. 5 lns 39-41, 52-59, and col. 6 lns 15-45).

Note in **Sasaki** the body centered cubic structure preference - col. 5 lns 27-28; col. 9 lns 61-64; col. 17 lns 38-41 and adjusting the grain size within that of the instant claimed range - i.e., less than 30 nm, see col. 3 lns 21-24.

As to claim 2:

Two kinds of element **M** may be used in the **Sasaki** compound - see col. 2 lns 53.

As to claims 3, 4, 8, and 10:

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Anisotropy is controlled by the action of **Co**, which may be adjusted as desired for increasing or decreasing the level of uniaxial magnetic anisotropy in **Sasaki** - see col. 5 lns ln 57-59.

As to axis in claims 11, 12, 13 and 14:

The specific size would have been a matter of routine optimization **Sasaki** shows this well with in the shorter than 50 nm size - see col. 5 lns 33-35.

As to claims 5 and 6:

Two kinds of element **M** may be used in the **Sasaki** compound - see col. 2 lns ln 53.

As to claims 15 and 16:

The specific resistance can be adjusted by adjusting the amorphous phase of the alloy as necessary see in **Sasaki** -col. 5 lns 23-35 and see col. 9 lns 15-19 and col. 17 lns 5-10.

As to claims 17 to 20:

The film is formed as a lamina in a magnetic head - col. 1 lns 8-24.

2. Claims 1 though 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Shigehiro et al** (JP 10270246 translated abstract submitted by applicants) taken with **Sasaki** (US 6210544).

It has been known to have **Fe-Co-Al-O** films - this is evident from **Shigehiro et al** JP, noting the abstract submitted by applicants and admissions regarding **Shigehiro et al** JP appearing in the instant disclosure page- -5- lines 11, 12, 15, and 16.

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In **Shigehiro et al JP** note the composition formula in the layer including:

Co 100 - (between 10 and 50) - (between 2 and 10) - (between 6 and 25) **Fe** (between 1 and 50) **M** (= to **Al, Zr, Ti, Hf**) (between 2 and 10) **O** (between 6 and 20) .

This **Shigehiro et al JP** composition appears to encompass the thin film layer claimed of Fe-Co-Al-O composition - cf. the formula of which is specified as:

(**Co** (between .05 and .65) **Fe** 1- (between .05 and .65)) 100 - (between .2 and 9 at% - between 1 to 12 at%)
M(= to **Al, Zr, Ti, Hf, Mg, or Be**) (between .2 and 9 at%) **O** (equal or more than 15 at%)
 ~ OR ~

Co (between 98 and 85) **Fe** (between 1 and 50) **M** (= to **Al, Zr, Ti, Hf**) (between 2 and 10) **O**
 (between 6 and 20) .

Shigehiro et al JP abstract does not point out the crystalline structure to acquire the soft magnetic layer character, nor does **Shigehiro et al JP** recite measures for forming the soft magnetic layer and the soft magnetic layer in the recording head. However, **Sasaki**, while also directing one to composition encompassing the required claimed **Fe-Co-M-O** composition for the thin film layer and the claimed recording head, teaches the crystalline grain structure and size.

Sasaki shows that the grain size as less than 30 nm and the grain structure as body centered cubic.

In **Sasaki** see the composition:

(**Co** 1- (between 0 and .7) **Fe** (i.e. "Q" is **Fe**) (between 0 and .7)) (balance) **M**(= to **Al, Zr, Ti, Hf, Mo, Si, W, B, Al, Ge, Ga** or any **Rare Earth**) (between 3 and 30) **O** (between 7 and 40) **X** (at zero)

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Note col. 3 lns 32 - 48, and ratios col. 7 26-51, col. 8 lns 44-54.

It would have been obvious to one having ordinary skill in the art to adopt the teachings of **Sasaki** in **Shigehiro et al JP**. The degree of 'X' present in the composition would be merely dependent on the desire to adjust corrosion resistance of the film - off balancing other, desirable magnetic characteristics for the head, such as flux densities, specific resistances and saturation magnetism (col. 5 lns 39-41, 52-59, and col. 6 lns 15-45).

The worker having ordinary skill would have been motivated to select 'X' at zero in order to induce a soft magnetic character as is required in the magnetic head of instant claims 19 and 20; also note the *body centered cubic* structure in **Sasaki** - see col. 5 lns 27-28; col. 9 lns 61-64; col. 17 lns 38-41 - where the *body centered cubic* structure is the preferred structure.

Also note that **Sasaki** teaches the grain size must be made *fine* - i.e., in the range of less than 30 nm (see col. 3 lns 21-24), well within that of the instant claimed range.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to adopt the **Sasaki** size of less than 30 nm and structure of a *body centered cubic* grain for the purpose of improving the magnetic characteristics, including magnetic permeability, saturation flux, and selecting the formula for inducing a soft magnetic character desired in a magnetic head (see **Sasaki** col. 1 lns 9-24), **Sasaki** being directed to forming a magnetic Head with soft magnetic core layer.

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One skilled in the art would have been motivated to adopt **Sasaki**, who teaches a soft magnetic composition, in **Shigehiro et al (JP)** with the expectation of inducing a soft magnetic character with increased the flux density and responsiveness in the recording means.

As to the *bcc* structure: **Sasaki** also teaches the required body centered cubic structure.

Note in **Sasaki** this body centered cubic structure preference - col. 5 lns 27-28; col. 9 lns 61-64; col. 17 lns 38-41 and **Sasaki** teaches adjusting the grain size within that of the instant claimed range - to less than 30 nm, see col. 3 lns 21-24.

As to claim 2:

Two kinds of element M may be used in the **Sasaki** compound - see col. 2 lns 53.

As to claims 3, 4, 8, and 10:

Anisotropy is controlled by the action of Co - which may be adjusted as desired for increasing or decreasing the level of uniaxial magnetic anisotropy in **Sasaki** - see col. 5 lns 57-59. As to axis in claims 11, 12, 13 and 14 the specific size would have been a matter of routine optimization **Sasaki** shows this well with in the shorter than 50 nm size - see col. 5 lns 33-35.

As to claims 5 and 6:

Two kinds of element M may be used in the **Sasaki** compound - see col. 2 lns 53.

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As to claims 15 and 16:

The specific resistance can be adjusted by adjusting the amorphous phase of the alloy as required in **Sasaki** – see col. 5 lns 23-35 and see col. 9 lns 15-19 and col. 17 lns 5-10.

As to claims 17 to 20:

The film is formed as a lamina in a magnetic head - col. 1 lns 8-24.

Applicant's arguments filed June 12, 2003 have been fully considered but they are not persuasive.

1. Applicants argue that the composition relationship in **Shigehiro** is reversed.

However from comparisons on page 6 of the Amendment:

- Fe instant claims = 30-94% in **Shigehiro** 10-50%;
- M instant claims = 0.2-9% in **Shigehiro** 2-10%;
- Co instant claims = 4-64% in **Shigehiro** 35-82%;

From the preceding relationship it is evident that the **Shigehiro** prior art overlaps the instant claimed range and is within the instant claimed range.

Shigehiro evidently also suggests the desirability of the ranges claimed by applicants with sufficient specificity.

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- The 'specificity' is shown in **Shigehiro** - see specific examples in Figures 11 and 12 that compare their $\text{Co}_{50}\text{Fe}_{32}\text{Al}_4\text{O}_{14}$ soft magnetic film to a prior art **FeTaN** film; Figs. 4 to 7 where $[y+z = \text{less than } 10]$ for $(\text{Co}_{.7}\text{Fe}_{.3})_{100-(y+z)}(\text{Al}_{.25}\text{O}_{.75})_{(y+z)}$ soft magnetic film and Figs. 9 where $[y = 5]$ for $(\text{Co}_{.7}\text{Fe}_{.3})_{100-(y)}\text{Al}_y\text{O}_z$ soft magnetic film.

2. Applicants argue that the composition relationship in **Sasaki** has no apparent overlap of ranges.

However, approximating the comparisons on page 4 of the Amendment:

- Fe instant claims = 35-95% in **Sasaki** 0-70%;
- Co instant claims = 5-65% in **Sasaki** 0-70%;
- M instant claims = 0.2-9% in **Sasaki** 3-30%;
- O instant claims = 1-12% in **Sasaki** 7-40%

From this relationship it is evident that the **Sasaki** prior art overlaps within the instant claimed range. As applicants point out, when **M - O** is just the balance of what results from the relationship $(\text{Co}_{1-d}\text{Fe}_d)_x\text{M}_y\text{O}_z\text{X}_w$ - i.e., where $x =$ the balance of y/z and w the relationship of **Fe - Co** to the total is a maximum of 80% in **Sasaki** where applicants would require at least 85%. However this is n=only a preferred range (**Sasaki** col. 3 ln 31) and it's been pointed out that the adjustment of the **O** (Oxygen) component to zero would have been a matter of choice merely depending on the degree of resistance to corrosion desired additionally note col. 19 lns 36 - 38 or the **M** (e.g., **Zr** or **Hf**) (**Sasaki** col. 17 lns 6-8, 22-23, 49-56) vs. the magnetic characteristics desired. In either case this

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prior art range in **Sasaki** is close enough for one skilled in the art would have expected the same soft magnetic properties¹

There has also been no objective evidence of the unobviousness of the instant claimed ranges, nor have there been evidence of *criticality* of the amounts or proportions.

- Generally, differences in concentration will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such is critical. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) See also *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969) (Claimed elastomeric polyurethanes which fell within the broad scope of the references were held to be unpatentable thereover because, among other reasons, there was no evidence of the criticality of the claimed ranges of molecular weight or molar proportions.).

Note also more recent cases applying this principle, *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997).

¹ Courts have held that a *prima facie* case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). Court held as proper a rejection of a claim directed to an alloy of “having 0.8% nickel, 0.3% molybdenum, up to 0.1% iron, balance titanium” as obvious over a reference disclosing alloys of 0.75% nickel, 0.25% molybdenum, balance titanium and 0.94% nickel, 0.31% molybdenum, balance titanium.

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Instant Fig. 2, Fig. 3 and Fig. 4 give an illustration of Al + O content variation with the flux density, with resistivity and with coercive force in $\text{Fe}_{0.8}\text{Co}_{0.2}(\text{Al-O})_{\text{MX}}$. Fig. 6 illustrates coercive forces in the axial directions of the soft magnetic layer, Fig. 7 illustrates corrosion resistivity, Fig. 11 illustrates stress and anisotropy magnetic fields of soft magnetic films.

- However, there are no technical details of how the illustrated results were obtained.
- There are no assertions what has been illustrated in the *Figs* would have been unexpected.
- There has been no have there been assertions of criticality.

Even if there were, no claim commensurate in scope with what has been illustrated has been presented nor are there any

Conclusion

The claims are 1 to 20.

All claims have been rejected.

THIS ACTION IS MADE FINAL.

See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Statutory Period for Reply to this final action


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

INQUIRES

Any inquiry concerning this communication from the examiner should be directed to examiner Louis Falasco, Ph.D. whose telephone number is 703.305-6974. The examiner can normally be reached M-F 9:30 AM – 6:00 PM.

- If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Paul Thibodeau may be reached at 703.308-2367.
- The Fax phone numbers for the organization where this application or proceeding is assigned are: 703.872-9310 for regular communications and 703.872-9311 for After Final communications.
- An inquiry of a general nature or relating to status of this application or proceeding should be directed to the TC 1700 receptionist whose telephone number is 703.308-0651.

LF
7/03


STEVAN A. RESAN
PRIMARY EXAMINER